

UNITED STATES PATENT APPLICATION

OF

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FOR

WASHING MACHINE

[0001] This application claims the benefit of Korean Application(s) No. 10-2002-0074959 filed on November 28, 2002 which is/are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

5 Field of the Invention

[0002] The present invention relates to a washing machine, and more particularly, to a washing machine having a filter case coupling assembly facilitating to attach/detach a filter case holding a noise filter filtering external noises from a control signal transferred from a control unit.

10 Discussion of the Related Art

[0003] Generally, water and detergent are held in a tub of a drum type washing machine and a laundry is put in a drum inside the tub. The drum is then rotated to perform washing, rinsing, and dewatering.

[0004] FIG. 1 is a cross-sectional view of a general drum type washing machine and
15 FIG. 2 is a perspective view of a filter case having a noise filter inside in a general drum type washing machine, in which the filter case coupled to a cabinet is shown.

[0005] Referring to FIG. 1 and FIG. 2, a general washing machine consists of a cabinet body 2 having an open top and an open front side, a tub 4 provided in the cabinet body 2 to hold water, a drum 6 rotatably provided in the tub 4 to hold laundry, a motor 8 in
20 rear of the tub 4 to rotate the drum 6, a cabinet cover 3 provided to the front side of the cabinet body 2 to have a laundry entrance, a top plate 5 provided over the cabinet cover 3, and a control panel 7 installed over the cabinet cover 3 having control parts inside. And, the control parts control an operation of the drum type washing machine.

[0006] A plurality of lifters 10 are installed on an inner circumference of the drum 6

in an axial direction to lift the laundry to a predetermined height on operating the washing machine.

[0007] An inlet valve 12 is installed over the tub 4 to supply water to the tub 4, and a drain pump 14 and a drain hose 15 for discharging the water in the tub 4 outside the washing machine are installed under the tub 4.

[0008] The various control parts (not shown in the drawing) for controlling the operation of the drum type washing machine are installed in the control panel 7. And, the control parts are connected to various equipments such as the motor 8, inlet valve 12, drain pump 14, and the like via wires (not shown in the drawing) to receive control signals.

[0009] In order to prevent the control signal from interfering with other signals or from attenuating, a plurality of noise filters filtering external noises are installed at various locations along the wires carrying the control signal.

[0010] Referring to FIG. 2, a noise filter 20 is loaded in a filter case 22, and is installed at one side of a cabinet body 2.

[0011] Specifically, an installation panel 2a on which the filter case 22 is mounted is provided to the cabinet body 2, and the filter case 22 is fixed to the installation panel 2a by screws S. In order to mount the filter case on a correct position, a guide protrusion 22a is formed at an upper end of a frame of the filter case 22 and a guide slot 2h is curved at the installation panel 2a to guide the guide protrusion 22a. As the guide protrusion 22a is assembled along the guide slot 2h so that coupling holes (not shown in the drawing) in which the screws will be inserted, respectively, are correctly disposed over corresponding positions, the screws S are screwed to install the filter case 22.

[0012] However, in assembling the filter case 22 and the cabinet body 2, the guide protrusion 22a, since the coupling holes should be correctly aligned while the guide

protrusion 22a is inserted along the guide slot 2h of the installation panel 2a, a user has difficulty in attaching/detaching the filter case having the noise filter 20 inside.

[0013] To overcome such a problem, development of a washing machine having a coupling assembly facilitating to attach/detach the filter case is needed.

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SUMMARY OF THE INVENTION

[0014] Accordingly, the present invention is directed to a filter case coupling assembly and washing machine using the same that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

10 [0015] An object of the present invention, which has been devised to solve the foregoing problem, lies in providing a filter case coupling assembly and washing machine using the same, by which attachment/detachment of a filter case holding a noise filter is facilitated.

15 [0016] Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent to those having ordinary skill in the art upon examination of the following or may be learned from a practice of the invention. The objectives and other advantages of the invention will be realized and attained by the subject matter particularly pointed out in the specification and claims hereof as well as in the appended drawings.

20 [0017] To achieve these objects and other advantages in accordance with the present invention, as embodied and broadly described herein, there is provided a filter case coupling assembly including at least one coupling protrusion formed at a filter case having a noise filter inside and at least one guide rail formed at a plate to guide the coupling protrusion to slide to be inserted therein wherein the filter case is mounted on the plate.

[0018] The coupling protrusion protrudes in a lateral direction from a lower edge of each side of the filter case.

[0019] In addition, the coupling protrusion may include a body protruding downward from a bottom of the filter case and guide protrusions protruding in a lateral direction from
5 lower edges of both sides of the body, respectively.

[0020] And, a front side of the guide rail is blocked so that the coupling protrusion inserted as long as a predetermined distance is unable to move ahead.

[0021] In another aspect of the present invention, there is provided a washing machine including a tub to hold water, a drum rotatably installed in the tub to hold laundry, a
10 cabinet having the tub and drum inside, a control panel coupled to the cabinet to have a control unit inside, a filter case having a noise filter inside, and a filter case coupling assembly for sliding on the cabinet and coupling the filter case to the cabinet.

[0022] In this case, the filter case is coupled to a top plate forming a topside of the cabinet. Specifically, the filter case is coupled to an upper surface of the top plate.

15 [0023] The filter case coupling assembly includes a pair of coupling protrusions protruding from lower edges of both sides of the filter case respectively and a pair of guide rails formed at the top plate to guide the coupling protrusions to slide to be inserted therein for coupling.

[0024] Besides, the filter case coupling assembly may include at least one coupling
20 protrusion protruding from a bottom of the filter case and at least one guide rail formed at the top plate to guide the coupling protrusion to slide to be inserted therein for coupling.

[0025] In this case, the coupling protrusion includes a body protruding downward from the bottom of the filter case and a pair of guide protrusions protruding in a lateral direction from lower edges of both sides of the body, respectively.

[0026] Meanwhile, a front side of the guide rail is blocked so that the coupling protrusion inserted as long as a predetermined distance is unable to move ahead.

[0027] The control panel is coupled to a rear side of the upper surface of the top plate, and the filter case is provided under the control panel.

5 [0028] Therefore, the filter case coupling assembly facilitates to assemble the filter case having the noise filter inside.

[0029] It is to be understood that both the foregoing explanation and the following detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0030] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain
15 the principle of the invention. In the drawings:

[0031] FIG. 1 a cross-sectional view of a general drum type washing machine;

[0032] FIG. 2 is a perspective view of a filter case having a noise filter inside in a general drum type washing machine, in which the filter case coupled to a cabinet is shown;

[0033] FIG. 3 a cross-sectional view of a drum type washing machine according to
20 the present invention;

[0034] FIG. 4 is a perspective view of a control panel provided to a washing machine according to the present invention;

[0035] FIG. 5 is a perspective view of a filter case coupling assembly according to one embodiment of the present invention;

[0036] FIG. 6 is a diagram of a filter case coupling assembly according to one embodiment of the present invention, in which a filter case is installed; and

[0037] FIG. 7 is a diagram of a filter case coupling assembly according to another embodiment of the present invention, in which a filter case is uninstalled.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0038] Reference will now be made in detail to the preferred embodiment(s) of the present invention, examples of which are illustrated in the accompanying drawings. Throughout the drawings, like elements are indicated using the same or similar reference
10 designations where possible.

[0039] FIG. 3 a cross-sectional view of a drum type washing machine according to the present invention. FIG. 4 is a perspective view of a control panel provided to a washing machine according to the present invention. FIG. 5 is a perspective view of a filter case coupling assembly according to one embodiment of the present invention. FIG. 6 is a diagram
15 of a filter case coupling assembly according to one embodiment of the present invention, in which a filter case is installed. And, FIG. 7 is a diagram of a filter case coupling assembly according to another embodiment of the present invention, in which a filter case is uninstalled.

[0040] Referring to FIG. 3 and FIG. 4, a washing machine cording to the present invention includes a cabinet forming an exterior of the washing machine, a tub 54 holding
20 water, a drum 56 rotatably provided in the tub 54 to hold laundry, and a motor 58 connected to the drum 56 in rear of the tub 54 to rotate the drum 56.

[0041] The cabinet includes a cabinet body 52 having an open topside and an open front side, a cabinet cover 53 provided to the front side of the cabinet body 52 to have a laundry entrance, and a top plate 55 provided on the topside of the cabinet body 52. A control

panel 57 is installed on a rear part of the top plate 55 to have control parts inside. And, the control parts control an operation of the drum type washing machine.

[0042] A plurality of lifters 60 are installed on an inner circumference of the drum 56 to lift the laundry to a predetermined height to fall on operating the washing machine.

5 [0043] An inlet valve 62 is installed under the control panel 57 to supply water to the tub 54, and a drain pump 64 for discharging the water outside the washing machine is installed under the tub 54.

[0044] The control unit constructed with the various control parts (not shown in the drawing) installed inside the control panel 57 is connected to various equipments such as the
10 motor 58, inlet valve 62, drain pump 64, and the like via wires 80 and transfers various control signals via the wires 80.

[0045] In order to prevent the control signals carried on the wires 80 from interfering with other signals or from attenuating, a noise filter 70 is installed in a lower part of the control panel 57.

15 [0046] And, a back panel 59 is fixed to the control panel 57 and an upper end of a rear side of the cabinet body 52 by screws (not shown in the drawing) to cover an open rear side of the control panel 57.

[0047] Referring to FIG. 5 and FIG. 6, the noise filter 70 is loaded in a filter case 72, and slides in the lower part of the control panel 57 to be installed on an upper surface of the
20 top plate 55.

[0048] For this, the present invention includes a coupling assembly for sliding to couple the filter case 72 to the cabinet, and more particularly, to the top plate 55.

[0049] The coupling assembly includes a pair of coupling protrusions 91a and 91b protruding from both lower ends of lateral sides of the filter case 72 and a pair of guide rails

92a and 92b guiding the coupling protrusions 91a and 91b to slide to be inserted therein, respectively.

[0050] And, a coupling boss 72a protrudes to a predetermined length in a rear direction from an upper end of the filter case 72 to fix to the back panel 59 by a screw, whereby the filter case 72 is fastened to the back panel 59 not to move on operating the washing machine. Moreover, a coupling hole 59h is formed at a portion of the back panel 59 corresponding to the coupling boss 72a of the filter case 72.

[0051] Meanwhile, when the coupling protrusions 91a and 91b are inserted as long as a predetermined distance along the guide rails 92a and 92b from a rear direction of the control panel 57, the guide rails 92a and 92b interrupt the coupling protrusions 91a and 91b not to go ahead. For this, the guide rails 92a and 92b have ‘ ’ and ‘ ’ type cross-sections, respectively, of which front ends are blocked and of which rear ends and confronting sides are open.

[0052] A process of assembling the filter case using the filter case coupling assembly is explained as follows.

[0053] First of all, the filter case 72 having the noise filter 70 loaded inside slides to be installed from a rear side of the control panel 57. Specifically a pair of the coupling protrusions 91a and 91b slide to be inserted in a pair of the guide rails 92a and 92b, respectively to be coupled thereto.

[0054] The screw is screwed in the coupling hole 59h of the back panel 59 and the coupling boss 72a of the filter case 72, and the back panel 59 is installed at the rear side of the control panel 57 by screws.

[0055] As the filter case 72 is fixed to the back panel 59, the filter case 72 is prevented from being loosened or separated despite vibrations generated from the operating washing machine.

[0056] Another embodiment of the present invention is explained by referring to FIG.

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[0057] Referring to FIG. 7, a filter case coupling assembly according to the present invention includes at least one coupling protrusion 93 protruding downward from a bottom of the filter case 72 and at least one guide rail 94 formed at the top plate 55 to guide the coupling protrusion 93 to slide to be inserted therein for coupling.

[0058] In this case, the coupling protrusion 93 includes a body 93a protruding downward from the bottom of the filter case 72 and a pair of guide protrusions 93b protruding in a lateral direction from both sides of an end of the body 93a, respectively.

[0059] And, a front end of the guide rail 94 is blocked like the first embodiment of the present invention so that the coupling protrusion 93 inserted in the guide rail 94 as long as a predetermined distance is unable to move ahead.

[0060] Accordingly, the above-constructed washing machine according to the present invention has the following advantages or effects.

[0061] First of all, the filter case having the noise filter inside slides to be installed in the cabinet of the washing machine, thereby facilitating to assemble the washing machine. Moreover, the filter case coupling assembly facilitates to install/uninstall the filter case to/from the cabinet of the washing machine.

[0062] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover such modifications and variations, provided they come within the scope of the appended claims and their equivalents.